



Plant-atmosphere exchange: field studies of the dispersion of pollen in the lower atmosphere

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The movement of pollen in the lower atmosphere is fundamental in the study of ecohydrology and the distribution of plants across the landscape. Since European colonization of the eastern US, Ragweed (genus *Ambrosia*), indigenous to North America, has spread across the world rapidly in the last 300 years. It produces large amounts of pollen that cause allergic reactions in much of the human population. However, the pollen release mechanism of ragweed and the entrainment of its pollen into the atmosphere are not well understood. Turbulent conditions at the ragweed canopy, anther dehiscence, and the morphology and behavior of the pistillodium play important roles in pollen release and subsequent dispersion of ragweed pollen. We report the results of two large-scale field experiments to measure pollen dispersion from an 18 acre plot dominated by mature *Ambrosia artemisiifolia* individuals. Measurements of 3-D wind velocity, atmospheric turbulence, solar radiation, humidity, temperature, atmospheric pollen concentration, and downwind pollen deposition were recorded. Additional data, including hourly leaf pollen concentrations and over 50 hours of micro-scale videography of pollen release were also obtained. The goal of this research is to investigate the atmospheric entrainment, dispersion, and deposition of this pollen following its early morning release from staminate flowers and the biological function played by ragweed floral morphology during pollen release.